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JAPANESE PATENT OFFICE

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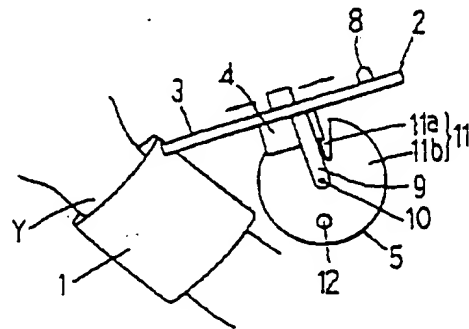
(72) Inventor: OKADA KOICHI
IWAI NOBUO

(54) SPHYGMOMANOMETER

(57) Abstract:

PURPOSE: To provide a sphygmomanometer which is easy to use and is capable of easily matching a cuff to the height position of the heart.

CONSTITUTION: This sphygmomanometer has the cuff 1 to be mounted at the required part Y of the human body to compresses this part to hinder the blood and a height adjusting means 2 adjustable to the height position of the heart X of the human body and is used to measure a blood-pressure value by the pressure in the cuff 1. This height adjusting means 2 consists of a reference member 3 fixed at its end to the cuff 1 and an indicating member 5 freely rotatably disposed at this reference member 3 in such a manner as to face one direction at all times. The reference member 3 is so constituted that this indicating member 5 is aligned to the prescribed position of the reference member 3 when the reference member 3 inclines at a prescribed angle from a horizontal direction.



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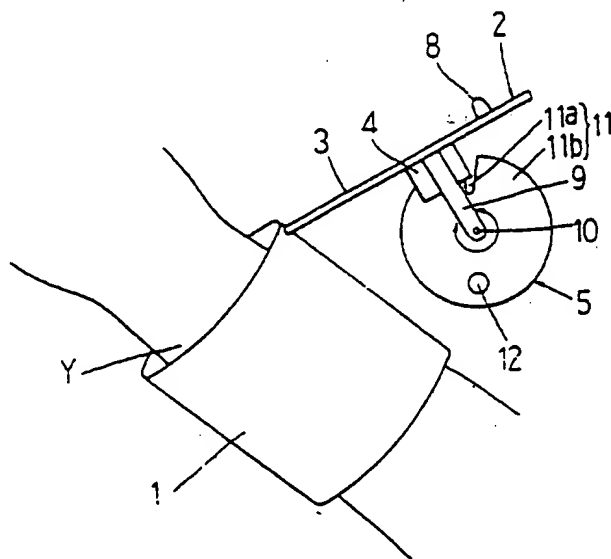
(74)代理人 弁理士 佐藤 成示 (外1名)

(54)【発明の名称】 血圧計

(57)【要約】

【目的】 使い勝手が良く、カフを心臓の高さ位置に容易に合わせることができる血圧計の提供を目的とする。

【構成】 人体の要部Yに装着して圧迫阻血するカフ1と、カフ1を人体の心臓Xの高さ位置に合わせ得る高さ合わせ手段2とを備え、カフ1内の圧力により血圧値を測定するものにおいて、高さ合わせ手段2を、端部がカフ1に固定される基準部材3と、常に一方向に向くよう基準部材3に回転自在に設けられる指示部材5とからなり、基準部材3が水平方向に対して所定量傾斜したとき指示部材5が基準部材3の所定位置に一致するよう構成した。



【特許請求の範囲】

【請求項1】 人体の手首又は指等の要部に装着して圧迫阻血するカフと、カフを人体の心臓の高さ位置に合わせ得る高さ合わせ手段とを備え、カフ内の圧力により最高血圧値及び最低血圧値を測定する血圧計において、前記高さ合わせ手段は、端部がカフに固定される基準部材と、常に一方向に向くよう基準部材に回転自在に設けられる指示部材とからなり、基準部材が水平方向に対して所定量傾斜したとき指示手段が基準部材の所定位置に一致するよう構成してなる血圧計。

【請求項2】 前記基準部材の所定位置に発光部と受光部とを有した光センサ手段を設け、指示部材に発光部からの光を通す通光部と発光部からの光を遮断する遮断部とを設け、基準部材が水平方向に対して所定量傾斜したとき通光部が発光部からの光を通し、それ以外のとき遮断部が発光部からの光を遮断する請求項1記載の血圧計。

【請求項3】 前記基準部材は、カフに固定される固定部と、固定部に対して角度調整可能となるものであって光センサ手段と指示部材とが設けられる基準部とからなる請求項2記載の血圧計。

【請求項4】 前記光センサ手段又は指示部材を、光センサ手段と指示部材との相対的な位置が調整可能となるよう基準部材に移動自在に設けてなる請求項2又は3記載の血圧計。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、血圧測定時にカフを心臓の高さに合わせるための手段を有する血圧計に関するものである。

【0002】

【従来の技術】手首や指等に装着するカフを有した血圧計によって血圧測定する場合、測定値と実際値との間に誤差が生じなくするために、カフを心臓の高さと略同高さにして測定する必要がある。このため、血圧測定時に、図10に示すように測定用のクッションを用いたり、目視にて感覚的にカフを心臓の高さ位置に合わせたりしていた。

【0003】しかし、クッションを用いる方法では、クッションが使用者に適した形状や大きさとなっていないか、腕がクッションに正しく当たっていないか、等により、正しい測定値が得られなくなる恐れがあった。また、目視にて感覚的に合わせる方法では、測定の度毎に測定値にバラツキが生じる恐れがあった。

【0004】これを解消するものとして、特開平5-200003号公報に開示されたものがある。これは、発光部（又は受光部）を有したカフを手首に装着するとともに、受光部（又は発光部）を有した高さ合わせ部を人体の心臓の辺りに装着し、カフが心臓の高さと略同高さとなったとき発光部からの光を受光部にて受光してブザ

一等の報知手段にて知らせるようにしている。

【0005】

【発明が解決しようとする課題】しかし、前述した特開平5-200003号公報に開示されたものは、前者に比べて精度良く測定値が得られるが、高さ合わせ部を人体の心臓の辺りに装着する必要がある、高さ合わせ部の装着が面倒であった。

【0006】本発明は、このような点に鑑みなされたものであり、その目的とするところは、使い勝手が良く、カフを心臓の高さ位置に容易に合わせることができ血圧計を提供することにある。

【0007】

【課題を解決するための手段】前記目的を達成するために、請求項1記載の血圧計は、人体の手首又は指等の要部に装着して圧迫阻血するカフと、カフを人体の心臓の高さ位置に合わせ得る高さ合わせ手段とを備え、カフ内の圧力により最高血圧値及び最低血圧値を測定する血圧計において、前記高さ合わせ手段が、端部がカフに固定される基準部材と、常に一方向に向くよう基準部材に回転自在に設けられる指示部材とからなり、基準部材が水平方向に対して所定量傾斜したとき指示手段が基準部材の所定位置に一致するよう構成してなる構成としている。

【0008】また、請求項2記載の血圧計は、請求項1記載のものの基準部材の所定位置に発光部と受光部とを有した光センサ手段を設け、指示部材に発光部からの光を通す通光部と発光部からの光を遮断する遮断部とを設け、基準部材が水平方向に対して所定量傾斜したとき通光部が発光部からの光を通し、それ以外のとき遮断部が発光部からの光を遮断する構成としている。

【0009】また、請求項3記載の血圧計は、請求項2記載のものの基準部材が、カフに固定される固定部と、固定部に対して角度調整可能となるものであって光センサ手段と指示部材とが設けられる基準部とからなる構成としている。

【0010】また、請求項4記載の血圧計は、請求項2又は3記載のものの光センサ手段又は指示部材を、光センサ手段と指示部材との相対的な位置が調整可能となるよう基準部材に移動自在に設けてなる構成としている。

【0011】

【作用】請求項1記載の構成によれば、基準部材が水平方向に対して所定量傾斜したときカフが心臓の高さと略同高さになるようにした場合、カフを人体の手首又は指等の要部に装着して要部を指示手段が基準部材の所定位置に一致するまで傾斜すると、カフが心臓の高さと略同高さになる。

【0012】請求項2記載の構成によれば、受光部が発光部からの光を受けるか否かにより、基準部材が水平方向に対して所定量傾斜したことを判断することができる。

【0013】請求項3記載の構成によれば、基準部が固定部に対して角度調整可能となるので、カフが装着される状況（位置、方向、向き等）に応じて固定部を角度調整することができる。

【0014】請求項4記載の構成によれば、光センサ手段と指示部材との相対的な位置が調整可能となるので、カフが装着される状況（位置、方向、向き等）に応じて光センサ手段と指示部材との相対的な位置を調整することができる。

【0015】

【実施例】本発明の第1実施例を図1乃至図7に基づいて説明する。

【0016】この血圧計は、カフ1と、カフ1を人体の心臓Xの高さ位置に合わせ得る高さ合わせ手段2とを備え、カフ1内の圧力により最高血圧値及び最低血圧値を測定するように構成されている。カフ1は、人体の手首又は指等の要部Yに巻き付けることにより装着して、内部に空気が圧送されることにより、要部Yを圧迫阻血するように形成されており、高さ合わせ手段2は、基準部材3と、光センサ手段4と、指示部材5とから構成されて

いる。

【0017】基準部材3は、大略矩形状をなし、その端面とカフ1の外表面との間の角度が一定となるように、すなわち、カフ1を要部Yに装着するとともにカフ1を心臓Xの高さと略同高さにしたとき基準部材3の端面が水平方向に対して略平行となるように、端部をカフ1に固着している。

【0018】光センサ手段4は、基準部材3の一端面に設けられており、ケーシングを互いに対向する面を有するように形成して、その対向する面の一方に発光部6を設け、他方の発光部6と対面する位置に受光部7を設けている。この光センサ手段4は、受光部7が発光部6からの光を受けると、基準部材3の他端面に設けた点灯部材8に出力して点灯部材8を点灯させるように機能する。

【0019】指示部材5は、光センサ手段4を挟むように基準部材3の一端面に略直交方向に配設された一対の支持部9,9と、大略円板状をなしその一部が発光部6と受光部7との間に位置して一対の支持部9,9の端部に軸10を介して回転自在となる回転部11とから構成される。回転部11は、外周の一部から内方へと略U字状に切り欠いて通光部11aを形成しており、通光部11a以外の部分を遮断部11bとしている。また、回転部11は、通光部11aが常に鉛直上方を向くように、通光部11aとの点対称位置におもり12を設けている。

【0020】次に、カフ1を心臓Xの高さ位置に合わせる方法について説明する。まず、図3に示すように、カフ1を要部Yに装着し、回転部11の端面が鉛直方向に対して略平行となるようにする。次に、要部Yを点灯部材8が点灯するまで傾斜すれば、カフ1が心臓Xの高さと

略同高さとなる。すなわち、点灯部材8は、カフ1が心臓Xの高さと略同高さでないとき、図4に示すように、遮断部11bが発光部6からの光を遮断して受光部7に該光が到達しないので消灯し、カフ1が心臓Xの高さと略同高さにあるとき、図7に示すように、通光部11aが発光部6からの光を通して受光部7に該光が到達するので点灯するからである。

【0021】したがって、本実施例は、カフ1が装着された要部Yを点灯部材8が点灯するまで傾斜すればカフ1が心臓Xの高さと略同高さとなるので、カフ1を心臓Xの高さと略同高さに容易に合わせることができ、精度良く血圧測定を行うことができる。

【0022】なお、本実施例では、受光部7が発光部6からの光を受けるか否かにより、カフ1が心臓Xの高さと略同高さであるか否かを判断するように構成したが、光センサ手段4を用いずに基準部材3に目盛りを設け、回転部11に通光部11aの代わりに針を設けて、目盛りと針とが重なるか否かにより、カフ1が心臓Xの高さと略同高さであるか否かを判断するように構成してもよい。

【0023】また、本実施例では、通光部11aが常に鉛直上方を向くように構成したが、通光部11aが常に鉛直上方以外の方向を向くように構成してもよい。

【0024】次に、本発明の第2実施例を図8に基づいて説明する。なお、先の第1実施例と実質的に同様な機能を有する部材については、同一の符号を付して説明を省略する。

【0025】本実施例の基準部材3は、カフ1に固定される固定部21と、角度調整用つまみ22により固定部21に対して角度調整可能となる基準部23とから構成される。固定部21と基準部23との回転中心は、軸10の軸線に対して略平行となっている。また、光センサ手段4及び指示部材5は、基準部23の一端面に設けられ、点灯部材8は、基準部23の他端面に設けられる。

【0026】したがって、本実施例は、角度調整用つまみ22により、基準部23が固定部21に対して角度調整可能となるので、カフ1を要部Yに装着したときの状況に応じて基準部23を角度調整することができ、さらに精度良くカフ1を心臓Xの高さと略同高さに合わせることができ。

【0027】なお、本実施例では、固定部21と基準部23との回転中心が軸10の軸線に対して略平行となるように構成したが、回転中心が軸10の軸線に対して略平行とならないように構成してもよい。

【0028】次に、本発明の第3実施例を図9に基づいて説明する。なお、先の第1及び第2実施例と実質的に同様な機能を有する部材については、同一の符号を付して説明を省略する。

【0029】本実施例の光センサ手段4は、発光部6と受光部7との間に回転部11の一部を位置させた状態で移動自在となるように基準部材3に設けられている。

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【0030】したがって、本実施例は、光センサ手段4と指示部材5との相対的な位置が調整可能となるので、カフ1を要部Yに装着したときの状況に応じて光センサ手段4と指示部材5との相対的な位置を調整することができ、さらに精度良くカフ1を心臓Xの高さと略同高さに合わせることができる。

【0031】なお、本実施例では、光センサ手段4をこれと指示部材5との相対的な位置が調整可能となるように基準部材3に移動自在に設けたが、指示部材5をこれと光センサ手段4との相対的な位置が調整可能となるように基準部材3に移動自在に設けてもよい。

【0032】

【発明の効果】請求項1記載の血圧計は、基準部材が水平方向に対して所定量傾斜したときカフが心臓の高さと略同高さになるようにした場合、カフを人体の手首又は指等の要部に装着して要部を指示手段が基準部材の所定位置に一致するまで傾斜すると、カフが心臓の高さと略同高さになるので、使い勝手が良いものであり、精度良く血圧測定を行うことができる。

【0033】請求項2記載の血圧計、請求項1記載の効果に加え、受光部が発光部からの光を受けるか否かにより、基準部材が水平方向に対して所定量傾斜したことを判断するので、さらに精度良くカフを心臓の高さと略同高さに合わせることができる。

【0034】請求項3記載の血圧計は、請求項2記載の効果に加え、基準部材が固定部に対して角度調整可能となるので、カフが装着される状況（位置、方向、向き等）に応じて基準部材を角度調整することができ、さらに精度良くカフを心臓の高さと略同高さに合わせることができる。

【0035】請求項4記載の血圧計は、請求項2又は3記載の効果に加え、光センサ手段と指示部材との相対的な位置が調整可能となるので、カフが装着される状況（位置、方向、向き等）に応じて光センサ手段と指示部

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材との相対的な位置を調整することができ、さらに精度良くカフを心臓の高さと略同高さに合わせることができる。

【図面の簡単な説明】

【図1】本発明の第1実施例の側面図である。

【図2】その高さ合わせ手段の下面図である。

【図3】そのカフが心臓の高さと略同高さにないときを示す説明図である。

【図4】そのカフが心臓の高さと略同高さにないときを示す簡略した部分拡大断面図である。

【図5】そのカフが心臓の高さと略同高さにあるときを示す説明図である。

【図6】そのカフが心臓の高さと略同高さにあるときを示す部分拡大側面図である。

【図7】そのカフが心臓の高さと略同高さにあるときを示す簡略した部分拡大断面図である。

【図8】本発明の第2実施例の側面図である。

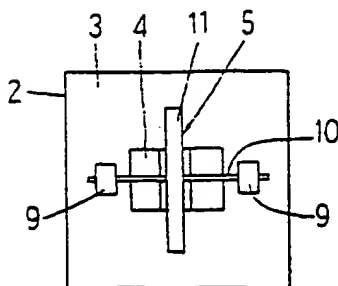
【図9】本発明の第3実施例の側面図である。

【図10】一従来例のカフが心臓の高さと略同高さにあるときを示す説明図である。

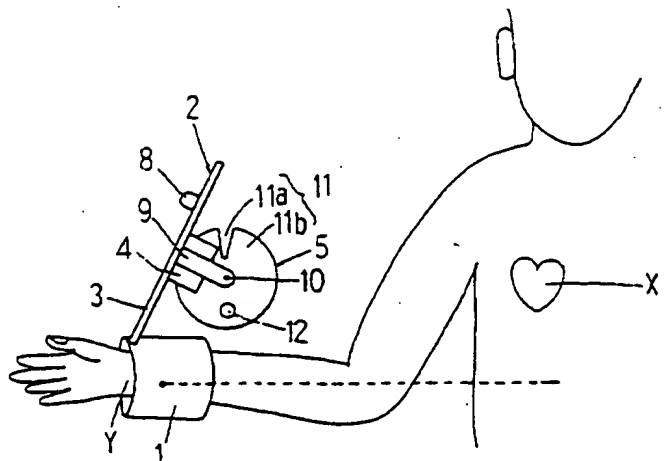
【符号の説明】

- 1 カフ
- 2 高さ合わせ手段
- 3 基準部材
- 4 光センサ手段
- 5 指示部材
- 6 発光部
- 7 受光部
- 11a 透光部
- 11b 遮断部
- 21 固定部
- 23 基準部
- X 心臓
- Y 要部

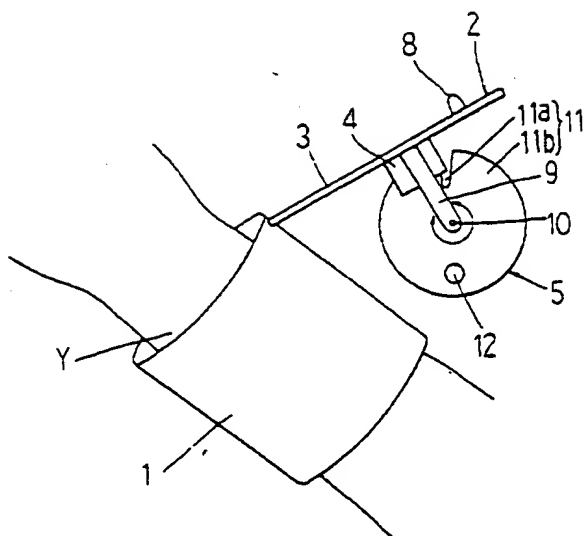
【図2】



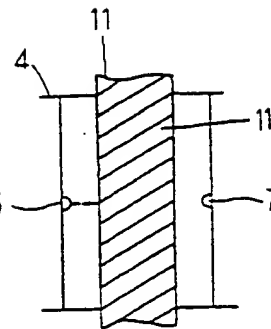
【図3】



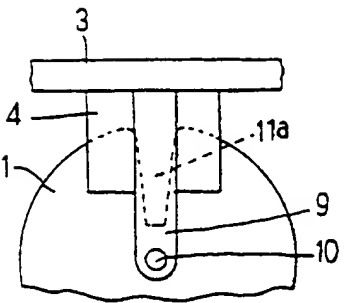
【図1】



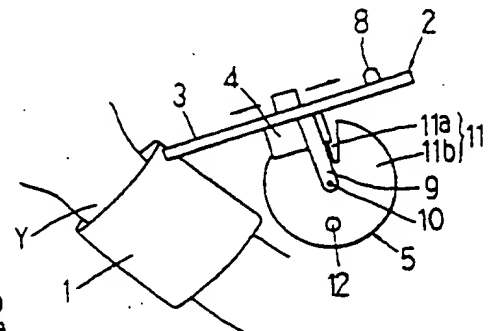
【図4】



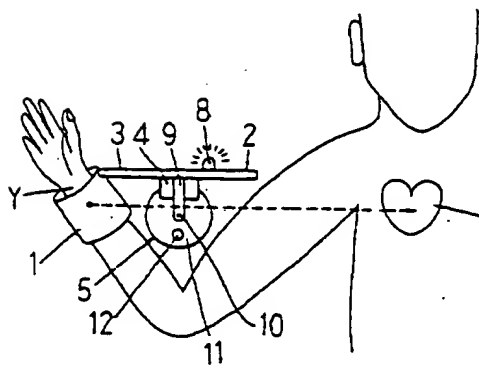
【図6】



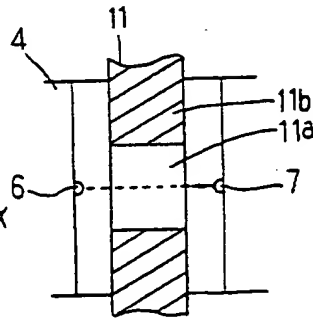
【図9】



【図5】

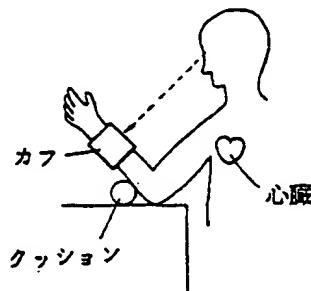
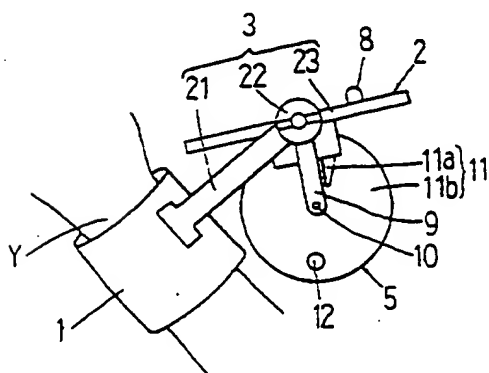


【図7】



【図10】

【図8】



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(and one other)

(54) Title of invention

Sphygmomanometer

(57) Abstract

Purpose: Provision of a sphygmomanometer, which can be easily used and where the cuff can be easily adjusted to the height position of the heart.

Constitution: In a sphygmomanometer, where a cuff 1 to be attached at the necessary part Y of the human body for compressing and hindering the blood, and a height adjusting means 2 to adjust the cuff 1 with the height position of the heart X of the human body are provided and the blood pressure value is measured by means of the pressure in the cuff 1, the height adjusting means 2 consists of a reference member 3, the end of which is fixed to the cuff 1, and an indicating member 5 provided freely rotatable at the reference member 3, so that it always faces one direction, and the indicating member 5 corresponds with a certain position of the reference member 3 when the reference member 3 has a certain inclination with regard to the horizontal direction.

Claims

1. A sphygmomanometer, where
a cuff to be fixed at the necessary part of a human body like a wrist or a finger for compressing and hindering the blood, and
a height adjusting means to adjust the cuff with the height position of the heart of the human body are provided and
the highest blood pressure value and the lowest blood pressure value is measured by means of the pressure in the cuff, whereby

the height adjusting means consists of a reference member, the end of which is fixed to the cuff, and an indicating member provided freely rotatable at the reference member, so that it always faces one direction, and the indicating member corresponds with a certain position of the reference member when the reference member has a certain inclination with regard to the horizontal direction.

2. A sphygmomanometer according to claim 1, where
a photosensor means having a light generating part and a light receiving part is provided at a certain position of the reference member,
a light passage part, where the light from the light generating part can pass, and a cutoff part cutting off the light from the light generating part are provided at the indicating member, and

the light from the light generating part passes the light passage part when the reference member has a certain inclination with regard to the horizontal direction, while the light from the light generating part is cut off by the cutoff part at all other times.

3. A sphygmomanometer according to claim 2, whereby the reference member consists of a fixed part being fixed to the cuff and a reference part provided with the photosensor means and an indication part, the angle of said reference part can be regulated with regard to the fixed part.
4. A sphygmomanometer according to claim 2 or 3, whereby the photosensor means or the indication part is provided movably at the reference part, so that the relative position of the photosensor means and the indication part becomes adjustable.

Detailed explanation of the invention

(0001)

Industrial field of the invention

The present invention relates to a sphygmomanometer having a means for adjusting the cuff to the height of the heart at the time of the blood pressure measurement.

(0002)

State of the art

When the blood pressure is measured by means of a sphygmomanometer having a cuff which is attached to the wrist or the finger, it is necessary to perform the measurement with the cuff having approximately the same height as the heart to avoid the occurrence of a discrepancy between the measured value and the actual value. Therefore, when the blood pressure is measured, a measuring cushion is used and the cuff is visually adjusted to the height position of the heart, like it is shown in figure 10.

(0003) But in case of the method using a cushion there is the risk that no correct measured value can be obtained, because, for example, the cushion might not have a shape or size being suited for the user or the arm might not be attached to the cushion correctly. In case of the method of a visual adjusting of the height

position there is further the risk that variations of the measured value occur with each measurement.

(0004) For the solution of this problem there is the device disclosed in the laid-open publication (1993) 5-200003. Here, the cuff having a light generating part (or a light receiving part) is attached to the wrist and a height adjusting part having a light receiving part (or a light generating part) is attached in the vicinity of the heart of the human body. When the cuff has reached approximately the same height as the height of the heart, the light from the light generating part is received by the light receiving part, which is reported by an information means like a buzzer or the like.

(0005)

Problem to be solved by the invention

In case of the device disclosed in the laid-open publication (1993) 5-200003, a measured value with good precision can be obtained in comparison with the former devices, but it is necessary to attach the height adjustment part in the vicinity of the heart of the human body and the attachment of this height adjustment part is troublesome.

(0006) The present invention has been made with regard to this problem. The purpose of the present invention is the provision of a sphygmomanometer, which can be

easily used and where the cuff can be easily adjusted to the height position of the heart.

(0007)

Means for the solution of the problem

For the solution of this problem, the sphygmomanometer according to claim 1, where a cuff to be fixed at the necessary part of a human body like a wrist or a finger for compression and hindering the blood, and a height adjusting means to adjust the cuff with the height position of the heart of the human body are provided and the highest blood pressure value and the lowest blood pressure value is measured by means of the pressure in the cuff, has a constitution, where the height adjusting means consists of a reference member, the end of which is fixed to the cuff, and an indicating member provided freely rotatable at the reference member, so that it always faces one direction, and the indicating member corresponds with a certain position of the reference member when the reference member has a certain inclination with regard to the horizontal direction.

(0008) The sphygmomanometer according to claim 2 has a constitution where in a sphygmomanometer of claim 1 a photosensor means having a light generating part and a light receiving part is provided at a certain position of the reference member, a light passage part, where the light from the light generating part can pass, and a cutoff part cutting off the light from the light generating part are provided at the indicating member,

and the light from the light generating part passes the light passage part when the reference member has a certain inclination with regard to the horizontal direction, while the light from the light generating part is cut off by the cutoff part at all other times.

(0009) The sphygmomanometer according to claim 3 has a constitution where the reference member of the sphygmomanometer of claim 2 consists of a fixed part being fixed to the cuff and a reference part provided with the photosensor means and an indication part, the angle of said reference part can be regulated with regard to the fixed part.

(0010) The sphygmomanometer according to claim 4 has a constitution where the photosensor means or the indication part of the sphygmomanometer of claim 2 or 3 is provided movably at the reference part, so that the relative position of the photosensor means and the indication part becomes adjustable.

(0011)

Effects

As, according to the constitution of claim 1, the cuff has reached approximately the same height as the height of the heart when the reference member has a certain inclination with regard to the horizontal direction, the cuff can reach approximately the same height as the height of the heart by attaching the cuff at the necessary part of the human body like the wrist or the fin-

ger and inclining the necessary part until the indicating member corresponds with a certain position of the reference member.

(0012) It is possible, according to the constitution of claim 2, to judge that the reference member has reached a certain inclination with regard to the horizontal direction by means of the reception or non-reception of the light from the light generating part by the light receiving part.

(0013) As the reference part can be regulated angularly with regard to the fixed part according to claim 3, it is possible to regulate the angle of the fixed part according to the attachment condition (position, direction, orientation etc.) of the cuff.

(0014) As the relative position of the photosensor means and the indication part becomes adjustable according to claim 4, it is possible to regulate the relative position of the photosensor means and the indication part according to the attachment condition (position, direction, orientation etc.) of the cuff.

(0015)

Embodiments

The first embodiment of the present invention is explained on basis of figures 1 to 7.

(0016) This sphygmomanometer is provided with a cuff 1 and a height adjusting means 2 to adjust the cuff 1 with the height position of the heart X of the human body. The highest blood pressure value and the lowest blood pressure value are measured by means of the pressure in the cuff 1. The cuff 1 is attached by wrapping it to the necessary part Y of the human body like the wrist or the finger and the blood of the necessary part Y is compressed and hindered by pressing air into the inside of the cuff 1. The height adjusting means 2 consists of a reference member 3, a photosensor means 4 and an indicating member 5.

(0017) The reference member 3 has the shape of a large approximate rectangle, and its end face is fixed to the cuff 1 so that the angle between this end face and the outer face of the cuff 1 becomes constant, this means, that the end face of the reference member 3 becomes approximately parallel with regard to the horizontal direction, when the cuff 1 is attached to the necessary part Y and has reached approximately the same height as the height of the heart X.

(0018) The photosensor means 4 is provided at one edge face of the reference member 3 and is formed in a way that it has faces mutually opposing a casing. A light generating part 6 is provided at one of these opposing faces while a light receiving part 7 is provided at the other face opposite to the light generating part 6. When the light from the light generating part 6 is received by the light receiving part 7, the photosensor

means 4 gives out an output to a lighting part 8 provided at the other edge face of the reference member 3 and this lighting part 8 lights up.

(0019) The indicating means 5 consists of a pair of support parts 9, 9 being located approximately rectangular on one edge face of the reference member 3 in a way so that the photosensor means 4 is interposed, and a rotation element 11 having approximately the shape of a large disk, a part of which is located between the light generating part 6 and the light receiving part 7, and being able to rotate freely at the ends of the support parts 9, 9 by means of an axis 10. The rotation element 11 is provided with a light passage part 11a cut out U-shaped from a part of the circumference towards the inside. The section of the rotation element 11 except this light passage part 11a designs a cutoff part 11b. At a position being point-symmetrically to the light passage part 11a, the rotation element 11 is provided with a weight 12, so that the light passage part 11a is always directed upwards vertically.

(0020) Next, the method for the adjustment of the cuff 1 to the height position of the heart X is explained. First, as it is shown in figure 3, the cuff is attached at the necessary part Y and the end face of the rotation element 11 becomes approximately parallel to the vertical direction. When the necessary part Y is then inclined until the lighting part 8 lights up, the cuff 1 has reached approximately the same height as the height position of the heart X. This means, the ligh-

ting part 8 does not light up, when the cuff 1 has not reached approximately the same height as the height position of the heart X, because, as it is shown in figure 4, the light from the light generating part 6 is cut off by the cutoff part 11b and does not reach the light receiving part 7, while the lighting part 8 lights up, when the cuff 1 has reached approximately the same height as the height position of the heart X, because, as it is shown in figure 7, the light from the light generation part 6 passes the light passage part 11a and reaches the light receiving part 7.

(0021) As therefore in the present embodiment the cuff 1 reaches approximately the same height as the height position of the heart X by inclining the necessary part Y, on which the cuff 1 is attached, until the lighting part 8 lights up, the cuff 1 can easily be adjusted to approximately the same height as the height position of the heart X and a blood pressure measurement with good precision can be performed.

(0022) The present embodiment has a constitution, in which the judgement, whether the cuff 1 has reached approximately the same height as the height position of the heart X or not, is performed by the reception or non-reception of the light from the light generating part 6 by the light receiving part 7, but a constitution, where no photosensor means 4 is used but a scale is provided at the reference member 3 and a needle is provided instead of the light passage part 11a at the

rotation element 11, and the judgment, if the cuff 1 has reached approximately the same height as the height of the heart X or not, is performed by the concurrence of the scale and the needle, is also possible.

(0023) In the present embodiment, the light passage part 11a is set up to always being directed vertically upwards, but a constitution, where the light passage part 11a is always directed into another direction than vertically upwards is also possible.

(0024) The second embodiment of the present invention is explained on basis of figure 8. Parts having substantially the same function as in the above first embodiment have been given the same reference numerals and will not be explained.

(0025) The reference member 3 of this embodiment consists of a fixed part 21 fixed to the cuff 1 and a reference part 23, the angle of which can be regulated with regard to the fixed part 21 by means of an angle regulation knob 22. The rotation center of the fixed part 21 and the reference part 23 is located approximately parallel to the axis line of the axis 10. The photosensor means 4 and the indicating means 5 are provided at one edge face of the reference part 23, while the lighting part 8 is provided on the other edge face of the reference part 23.

(0026) As therefore the angle of the reference part 23 can be regulated in the present embodiment with regard

to the fixed part 21 by means of the angle regulation knob 22, the reference part 23 can be regulated angularly according to the attachment condition of the cuff 1 to the necessary part Y and furthermore the cuff 1 can be adjusted with good precision to approximately the same height as the height of the heart X.

(0027) In the present embodiment the rotation center of the fixed part 21 and the reference part 23 is approximately parallel to the axis line of the axis 10, but a constitution, where the rotation center does not become approximately parallel to the axis line of the axis 10 is also possible.

(0028) The third embodiment of the present invention is explained on basis of figure 9. Parts having substantially the same function as in the above first and second embodiments have been given the same reference numerals and will not be explained.

(0029) The photosensor means 4 of the present embodiment is provided at the reference member 3 in a form, that it becomes freely movable when a part of the rotation element 11 is located between the light generating part 6 and the light receiving part 7.

(0030) As therefore the relative position of the photosensor means 4 and the indicating member 5 becomes adjustable in the present embodiment, the relative position of the photosensor means 4 and the indicating member 5 can be regulated according to the attachment

condition of the cuff 1 to the necessary part Y and the cuff 1 can be adjusted with good precision to approximately the same height as the height of the heart X.

(0031) In the present embodiment the photosensor means 4 is provided freely movable at the reference member 3, so that the relative position of this photosensor means 4 and the indicating member 5 becomes adjustable, but it is also possible to provide the indicating member 5 at the reference member 3 so that the relative position of this indicating member 5 and the photosensor means 4 becomes adjustable.

(0032)

Results of the invention

As, in case of the sphygmomanometer of claim 1, the cuff can reach approximately the same height as the height position of the heart by a certain inclination with regard to the horizontal direction, the cuff reaches approximately the same height as the height position of the heart when the cuff is attached at the necessary part of the human body like the wrist or the finger and the necessary part is inclined until the indicating member corresponds with a certain position of the reference member, and therefore the sphygmomanometer can easily be used and a blood pressure measurement with good precision can be performed.

(0033) As additionally to the result of claim 1 it can be judged, in case of the sphygmomanometer of claim 2,

that the reference member has a certain inclination with regard to the horizontal direction by means of the reception or non-reception of the light from the light generating part by the light receiving part, the cuff can be adjusted even more precisely to approximately the same height as the height of the heart.

(0034) As additionally to the result of claim 2 the reference part can be regulated angularly with regard to the fixed part in case of the sphygmomanometer of claim 3, the reference part can be regulated angularly according to the attachment condition (position, direction, orientation etc.) of the cuff, and the cuff can be adjusted even more precisely to approximately the same height as the height of the heart.

(0035) As additionally to the results of claims 2 and 3 the relative position of the photosensor means and the indicating member becomes adjustable in case of the sphygmomanometer of claim 4, the relative position of the photosensor means and the indicating member can be regulated according to the attachment condition (position, direction, orientation etc.) of the cuff, and the cuff can be adjusted even more precisely to approximately the same height as the height of the heart.

Simple explanation of the figures

Figure 1 is a side view of the first embodiment of the present invention.

Figure 2 is a view of the bottom side of the height adjusting means.

Figure 3 is an explanation showing the cuff not in approximately the same height as the height of the heart.

Figure 4 is a simplified partially enlarged section view showing the cuff not in approximately the same height as the height of the heart.

Figure 5 is an explanation showing the cuff in approximately the same height as the height of the heart.

Figure 6 is a partially enlarged side view showing the cuff in approximately the same height as the height of the heart.

Figure 7 is a simplified partially enlarged section view showing the cuff in approximately the same height as the height of the heart.

Figure 8 is a side view of the second embodiment of the present invention.

Figure 9 is a side view of the third embodiment of the present invention.

Figure 10 is an explanation showing the cuff of a hitherto example being in approximately the same height as the height of the heart.

Explanation of the reference numerals

- 1 cuff
- 2 height adjusting means
- 3 reference member
- 4 photosensor means
- 5 indicating member
- 6 light generating part
- 7 light receiving part
- 11a light passage part
- 11b cutoff part
- 21 fixed part
- 23 reference part
- X heart
- Y necessary part